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ABSTRACT

This study focused on the problem of deaf and hard of hearing learners who have very low English literacy levels compared to their ability levels. Participants in the study were deaf and hard of hearing adult learners in the Adult Basic Education Program of the Center on Deafness in Pittsburgh, Pennsylvania. This mixed urban-rural population had some students from Pittsburgh and others from small towns in southwest Pennsylvania. The Test of Adult Basic Education (TABE) was used. Reading pretest scores of participants ranged from a high of 2.6 to a low of 1.9. Language pretest scores ranged from a high of 2.8 to a low of 1.1. The intervention used for the study was a metacognitive teaching-learning process, pioneered by Donald Meichenbaum, that focuses on assisting students to use their knowledge and apply it to new learning or tasks, e.g., reading and comprehending a story or article. Data were collected using pretest and posttest scores of students on the TABE, samples of student writing, and observations of student learning during instruction. TABE results showed less than one grade level gain from pretest to posttest. Writing samples showed growth in content organization and elaboration, but not in grammar use. Learning clearly became more student-directed. (YLB)

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PRODUCT

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Staff Development Through
Six Professional Development Centers"

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Project Director
Dr. Gary Kuhne
Assistant Professor and Regional Director of Adult Education
The Pennsylvania State University

Note: Action Research is a process of systematic inquiry credited to Kurt Lewin who popularized it in the U.S. in the 1940's. Today it is considered a system of qualitative research. Typical of action research, none of the individual projects in this monograph series claims to have generalizable application beyond the specific project described. However, each monograph report can serve to be illustrative, instructive and provides the potential for replication in other locations. For a level of generalizability, it is recommended that the reader seek common patterns in the monograph reports in this series, and the wider literature, or contact the Action Research Network for assistance in this.

I. ABSTRACT

Deaf and Hard of Hearing learners, but particularly Deaf learners, have very low English literacy levels compared to their ability levels. This occurs in spite of their education beginning at 2 or 2 1/2 years of age. In fact, the average literacy level of deaf adults in America is below a fourth grade level (CADS, 1991; Allen 1986; Trybus and Karchmer, 1977).

The population served in this study is Deaf and Hard of Hearing adult learners in the Center On Deafness Adult Basic Education Program. This is a mixed urban-rural population with some students coming from the City of Pittsburgh and others coming from small towns in southwest Pennsylvania.

The Test of Adult Basic Education (TABE) was used in this study. Reading pretest scores of students participating ranged from a high of 2.6 to a low of 1.9. Language pretest scores ranged from a high of 2.8 to a low of 1.1.

The intervention used for this study was a metacognitive teaching-learning process pioneered by Dr. Donald Meichenbaum. The intervention focuses on assisting students to use their knowledge and apply it to new learning or tasks, e.g., reading and comprehending a story or article.

Data were collected using pretest and post test scores of students on the TABE, samples of student writing, and observations of student learning during instruction.

The results of the TABE showed significantly less than one grade level gain from pretest to posttest. Writing samples showed no significant grammatical change but growth in content organization and elaboration. Learning clearly became more student directed.

II. PROBLEM

The Center On Deafness in Pittsburgh provides an Adult Basic and Literacy Education Program for Deaf and Hard of Hearing adult learners in southwest Pennsylvania. Adult learners have ranged from 17 to 69 years of age. Deaf and Hard of Hearing learners, but particularly Deaf learners, have very low English literacy levels compared to their ability levels. This occurs in spite of their education beginning at 2 or 2 1/2 years of age. In fact, the average literacy level of deaf adults in America is below a fourth grade level (CADS, 1991; Allen, 1986; Trybus and Karchmer, 1977).

Deaf and Hard of Hearing people comprise approximately 9 percent of the total U.S. population. The incidence of hearing loss is not evenly distributed across age groups. The distribution is bipolar. There is a higher incidence of hearing loss, especially deafness in very young children than there is in children at the secondary level. As people age the incidence of hearing loss increases until it is thirty percent of the population over sixty years of age. Hearing loss, particularly deafness, is a hidden handicap. There is no overt physical manifestation of its existence. As a result of this few people are aware of the presence of deaf and hard of hearing people in the community.

The role of the Center On Deafness is multiple. It provides ABE programs of the Deaf and Hard of Hearing communities; it advocates in the work place to assist hiring, training, and promotion; and it provides ongoing education for deaf and hard of hearing workers whose jobs have been phased out or revised requiring that they add to their knowledge and skill base.

The low English literacy level occurs because of Deaf and Hard of Hearing persons limited proficiency in phonetic, morphological and syntactic aspects of English. This problem is further compound in pragmatic aspects of English by the absence or limited amount of incidental learning (indirect learning) caused by early onset of severe hearing loss which also reduces the general cultural knowledge base. The reduced cultural knowledge base adversely impacts reading comprehension, as does the limited proficiency in English.

Historically, deaf individuals have been taught with a great reliance on rote memory. This results in limited metacognitive skills and limited development of strategy and strategy abstraction in thinking. The teaching method and limited development in metacognitive areas causes deaf and hard of hearing learners to rely on memorization of facts and ideas instead of comprehension of them.

Use of metacognitive and strategic thinking-learning processes in teaching literacy should increase deaf and hard of hearing learner independence in mastering English literacy. More independence would lead to learners more effectively using their ability, experience and existing knowledge.

Resolution of the problem of limited English literacy would improve the number of deaf and hard of hearing individuals capable and willing to continue their battle toward English literacy.

The learning environment would be improved through learners having feelings of durable

success and greater independence. This may also result in more students progressing to post secondary or technical training or obtaining employment.

III. PLANNING

Intervention plan

The intervention to be used is a metacognitive teaching-learning process pioneered by Dr. Donald Meichenbaum. This method has been shown to enhance learning at knowledge, skill and application levels. The latter is significant because it has been found that this method results in students being able to apply learning in one content domain to other content domains as well as applying what is learned to "real life" problems.

Time frame

The project began in October, 1998 and ends in May, 1999. This time period includes time for pretesting and post testing.

Materials

1) assessment instruments, 2) high interest-low difficulty reading materials, 3) Reading materials for skill building, comprehension, and application of literacy, 4) transparency projector, and 5) computers. These materials are needed to provide assessment data, learning experiences, and accommodation of the visual learning of deaf and hard of hearing students.

Data collection strategies

Initial collection of assessment data involved administration of the Test of Adult Basic Education (TABE). The TABE is a standardized test sampling student performance in language and computational areas. Samples of student writing and observation of student learning were also taken. Each of these measures was taken at the beginning of the project and the end of the project.

Baseline

The baseline used in this project was student performance on the Test of Adult Basic Education, initial sample of student writing, and observation of student learning.

Criteria for success

Success is defined as an increase of one grade level on the TABE from pretest to post test after the October, 1998 to May, 1999 instructional period.

Constraints

There are seven constraints in this research project. Naturally, with so many constraints and their potential to have an interactive effect it is not possible to quantify the effect of each. The constraints are presented below and discussed individually.

1. Time-the procedural type of learning that is inherent to this method may require more than one year to have a complete effect.
2. Student mental habits -changing student reliance on memorization will be a primary thrust of instruction.
3. Student attitudes about self and capability to learn-deaf students typically have negative attitudes about their ability to learn.
4. Bias in testing-the bias in standardized testing is difficult to overcome. The use of portfolios, curriculum-based assessment, and individual consultation provided less bias data.
5. Student cultural knowledge and beliefs-some of the cultural knowledge base will be improved. Student beliefs about English, hearing people, and deaf people's ability to master English will be addressed through classroom instruction led by a deaf instructor fluent in American Sign Language.
6. Student learning strategies-the instructional method of this research project focuses on metacognitive and thinking-learning processes which are designed to improve student learning strategies.
7. Student self-direction-the teaching technique employed in this research is student center with an emphasis on student self-direction.

Approval

Approval to do research is achieved through review of the Research Review Committee, which approves research for the Center On Deafness. Students were also asked for their approval

to participate in this research. The research goal and process were explained to the students as was their role in it. Any student not wishing to participate was assured that the more traditional instructional model was available to them.

Current literature and recommendations

a) All data available show that the teaching-learning paradigm used with deaf learners consistently results in deaf adults having an average literacy level at the 4th grade level. This literature also shows that the problem has a long history and that traditional methods have not overcome this history (CADS, 1991; Allen, 1986; Trybus and Karchmer, 1977). The pervasive effect of deaf and hard of hearing learner English literacy has been show in the area of mathematics as well. In mathematics the performance of students with hearing loss is considerably lower than for the norming groups (Daniele, 1993).

b) Current research being conducted in both the United States and Canada has shown that the method proposed herein has a positive effect on student literacy. At Friendship Valley Elementary School in Maryland, and in a Canadian school system in Toronto, the technique has resulted in improved academic learning levels and student performance. In Canada, this method has been found to be successful when used with low achieving learners.

Problem statement

Will the use of a metacognitive teaching-learning process in the Deaf and Hard of Hearing Adult Literacy Program at the Center On Deafness improve deaf and hard of hearing learners use of metacognition in thinking and reading tasks during the October 1998 to May 1999 program period?

IV. ACTION

The intervention involved presenting students with learning tasks, e.g., reading an article or a book. The student then followed through with reading. After completing the reading assignment, the student wrote a summary of what was read and identified new or unknown vocabulary. After all students finished their writing was converted to transparencies and discussed as a group with the writer explaining what his or her meaning was. Fellow students made suggestions about how to expand or clarify what was written. Fellow students also made

suggestions about the choice of sentence style or vocabulary. The instructor served as a consultant in this process.

This resulted in identifying cultural elements that were not clear to students and vocabulary or elements of vocabulary and grammar such as pluralization, verb tense, and use of prepositions that were not clear to students. Using this material the instructor guided the students in applying what they knew about ASL to understanding English and the rules governing English.

The process helped students practice use of their metacognitive skills, knowledge base, and steps in arriving at an understanding. The process also fostered student self-direction.

Deaf and Hard of Hearing adult learners enrolled in the program were pretested prior to any instruction, counseling, or advisement. The pretest was administered in September and the first week of October. Pretesting involved administration of the TABE, collection of a writing sample from each student and observation of student learning when given a literacy task.

Pretesting was immediately followed by consultation with each student about what their learning goals were for the year. The consultation was followed by instruction using the new methodology started at the beginning of October and ran until the end of May.

Once a month each student and the instructor met to review their goal of learning and discuss progress to date. This provided time to relate instruction to more practical needs like employment, job search, and independent living.

Students attended class once a week for three hours. During Thanksgiving and the December holidays classes did not meet.

In mid May the post test was administered and data reported herein -- Table 1.

The materials used were: 1) the Test of Adult Basic Education, 2) high interest - low difficulty reading materials, 3) reading materials emphasizing application of literacy (U.S.A. Today, Pittsburgh Post Gazette, Deaf Life, NAD Broadcaster, Silent News, Deaf Nation, Inc. magazine), 4) computers to facilitate editing, 5)transparency projector for discussing student products and using the "spider network" technique of editing student work as a group. These materials accommodate the visual learning of deaf and hard of hearing students, provide learning experiences, and assessment data.

Constraints

1. Time-the procedural type of learning that is inherent to this method may require more than one year to have a complete effect. A research study done at Friendship Valley Elementary School in Maryland found no significant effect on achievement test scores until the third year. Studies currently being done at the Western Pennsylvania School for the Deaf are also showing that it takes more time for the students to learn how to use their metacognition in learning.

2. Student mental habits -deaf individuals have traditionally been taught through memorization of facts and information. One of the constraints this research faced was deaf adult learner preference for memorization instead of comprehension and application. The technique used in the project teaches a new way to think-learn.

3. Student attitudes about self and capability to learn-deaf individuals believe that only hearing people master subjects at a higher level. This project focused instructional elements on enhancing student attitudes toward their ability to learn.

4. Bias in testing-the bias in standardized testing is difficult to overcome. The use of student writing samples, curriculum-based assessment, and individual consultation provided less bias in helping the student, but does not solve the issue of the need to compare deaf adult learners to other learners.

5. Student cultural knowledge and beliefs-the cultural knowledge base was a major constraint. The process of learning culture is mainly through indirect learning and communication. Indirect learning is limited by deafness. Communication is limited by a variety of factors: late diagnosis of hearing loss, parents unfamiliar and unskilled with communication adaptations (90% of deaf children have hearing parents), missing the primary language development period of birth to five years of age. Student cultural knowledge and beliefs about their ability to learn were addressed directly by having a deaf instructor who modeled appropriate attitudes and techniques, as well as related deaf and hearing culture

6. Student learning strategies-deaf adult learners tend to rely on memorization and rote learning to enhance knowledge. They do not tend to use their current knowledge base to know and understand new knowledge. The instructional method of this research project focuses on metacognitive and thinking-learning processes which are designed to improve student learning strategies.

7. Student self-direction-deaf adult learners were typically taught with a very teacher-centered instructional approach. The teaching technique employed in this research is student center with an emphasis on student self-direction.

Problems

There were two problems. One was that student employment kept increasing so attendance by some students stopped. Another problem was that a few students ended their attendance due to mental health issues. This decline in enrollment somewhat reduced the richness of interaction among students, especially as that applies to fewer insights from fellow students and application of different experiential bases.

V. RESULTS

The data collected with the pretest and post test of the TABE are in Table 1. The range of scores in the reading pretest was from a low of 1.7 to a high of 2.6. The reading post test scores ranged from a low of 2.1 to a high of 2.8. The Language Pretest ranged from a low of 1.1 to a high of 2.8. The range of scores on the Language Post test was from a low of 1.1 to a high of 2.8. The data show that students as a group or individually did not gain one grade level. All of the instruction focused on reading, writing, and applying student knowledge of American Sign Language to understanding English. The lack of change of scores on the math test is not significant since the one instructional time per week that students came to class was entirely spent on mastering English literacy.

Table 1
Test of Adult Basic Education
Grade Equivalent Scores

	Reading Pretest	Reading Post test	Math Pretest	Math Posttest	Language Pretest	Language Post test
Student 1	2.4	2.8	2.2	2.3	2.8	2.8
Student 2	1.7	1.9	1.3	1.3	1.2	1.3
Student 3	1.9	2.1	1.1	1.1	1.1	1.1
Student 4	2.6	2.6	3.4	3.3	2.5	2.7
Student 5	2.2	2.2	3.6	3.6	2.7	2.8

The students writing sample showed minimal improvement at the grammatical level. Students did demonstrate better content organization and elaboration in their writing. Learning was primarily student-centered. In the learner-centered environment students showed more use of their knowledge of American Sign Language to understand English at the end of instruction than at the beginning.

The project failed to increase student performance on the TABE by one grade level. Student interest in the larger culture improved. Students showed no interest and little understanding of newspapers at the beginning of instruction (October, 1998). At the end of instruction (May, 1999) students actively sought out the newspapers to read and demonstrated a better understanding of article content in class discussion and their writing. Students also used their knowledge of ASL to understand the conventions of English. One example is how they understood pluralization in English to be different from ASL. ASL uses "reduplication", i.e., repetition of a movement to pluralize, whereas English uses suffixes.

The amount of negative talk about their ability to learn also declined during instruction. In October, 1998 students were very likely to say "I can't understand. That English". At the end of instruction, students were very likely to say something about the similarities and differences in structure between ASL and English.

The problem statement that students would increase literacy on the TABE by one grade level did not happen. However, there was a change in how self-directed the students were and how much they used their own knowledge and thinking skills to understand what was read or to understand a word. It appears that the method improves the use of metacognition. The lack of gain in reading scores seems to be caused by instruction not having enough of a skills focus. So it appears that future efforts must be a blend of the more traditional content and the new instructional technique. Finally, the amount to be learned and the complexity of developing more use of metacognition necessitates a longer instructional period of time.

The course work impacted students attitudes and beliefs about their ability to learn and how to learn. From evidence obtained during counseling sessions, students had a greater tendency to look for relationships between things than to look at each bit of knowledge as discrete and separate from other knowledge.

VI. REFLECTION

Students showed more willingness to pursue English literacy and were able to relate it to the workplace. Students learning how to relate ASL to English was a major breakthrough. It was apparent that they had never been taught in a manner that used their existing ASL knowledge to try and understand another language.

The experimental method was used sufficiently but skills instruction was not used sufficiently. The measurement tools used did not regularly provide enough feedback and feelings of progress for the student. This caused some student learning to be under developed. There were not enough benchmarks of progress for the student to see. This may have reduced student confidence or interest.

What would you do differently?

Use more checklists and likert type scales to measure progress in learning.

Use more skill instruction.

Break instruction into a series of spiraled mini courses

Update the curriculum materials to provide a better literacy-maturity level match.

Identify a more comprehensive language measure to assess literacy.

Use a battery of tests at the intake point, so that student performance is more exactly determined.

This project was successful enough to merit its continuance with the modifications noted. We intend to continue researching and improving the delivery of this method of instruction.

The deaf students responded well to this type of instructional methodology. It needs more research to fully articulate it for this population.

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Appendix:

The following represent additional resources for exploring the value of Dr. Meichenbaum's theory and practices regarding the use of metacognitive elements in teaching to increase learner performance and independence. The list can be considered dated since Meichenbaum is actively involved in several school-based studies in Pennsylvania and Canada. As of this writing, the newest book published is ***Nurturing Independent Learners: Helping Students Take Charge of Their Learning,*** by Donald Meichenbaum and Andrew Biemiller, 1998, Brookline Books, Cambridge, MA. This book presents his three dimensional model of teaching-learning called *The Three Dimensions of Mastery* which are Self-Direction Dimension, Skill and Vocabulary Dimension, and Planning/Complexity Application Dimension.

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